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*SPECIFICATION*  
**(DESCRIPTION) FIELD OF THE INVENTION**

The present invention relates to a pipe fitting for *(inside) internally* coated pipes and to a method for its installation.

In particular, the present invention relates to pipe fittings for piping chemical, acid, abrasive, wearing products, etc.

*BACKGROUND OF THE INVENTION*

The pipes of the above type currently comprise an inside layer made of rubber, plastic, thermoplastic rubber, or other material adapted to resist *(to)* the product to be piped.

An intermediate stiffening layer is integral to it, and it is adapted to impart vacuum and/or pressure resistance to the pipe, realised <sup>2</sup> through metal (wires, strings, strands) or textile (polyester, polyamide, aramide, rayon or other) plaits or spirals.

Finally, on the intermediate layer there is applied a covering layer adapted to protect the pipe from the action of external (atmospheric, chemical, mechanical wear[ing] etc.) agents, <sup>or effects</sup> made of rubber, plastic, thermoplastic rubber, polyurethane, fabric, or other.

At the ends of the pipes there are applied pipe fittings allowing the connection of more pipes to one another.

In traditional embodiments, such <sup>fittings</sup> *(pipes)* are made integral to the pipes during production, and they cannot be separated from the finished pipe; in practice, pipe fittings and pipes form a

single piece.

However, traditional pipes cannot be produced in standard sizes to be stored and successively cut according to the buyers' requirements, since pipe fittings must in any case be applied to the ends of the pipes during production.

Thus, in practice, traditional pipes are produced on request, and they are sized according to the sizes required by the buyers.

### OBJECTS OF THE INVENTION

Thus, <sup>an</sup> ~~the technical~~ object of the present invention is ~~that~~ <sup>to eliminate</sup> of eliminating the above technical disadvantages of the prior art ~~by~~ <sup>with</sup> realising a pipe fitting for ~~inside~~ <sup>internally</sup> coated pipes which ~~could~~ <sup>can</sup> be connected to an end of the finished pipe of the indicated type when the same pipe is installed, that is, even at the building yard.

<sup>another object</sup> Within the scope of this technical object, a purpose of the invention is <sup>to provide</sup> ~~that of realising~~ a pipe fitting which ~~should~~ <sup>can</sup> allow producing standard length pipes which ~~could~~ <sup>can</sup> be stored and successively cut according to the buyers' requirements.

Another <sup>object</sup> ~~purpose~~ of the invention is <sup>to provide</sup> ~~that of realising~~ a pipe fitting which ~~should~~ <sup>can</sup> guarantee a resistance to the piped product similar to that guaranteed by the pipes.

A further <sup>object</sup> ~~purpose~~ of the invention is <sup>to provide</sup> ~~that of indicating~~ a method ~~for~~ <sup>of</sup> installing ~~the~~ pipe fittings, so that may be installed on the finished pipes in a simple and quick manner.

<sup>These objects</sup> ~~The technical object, as well as this~~ and other <sup>SUMMARY OF THE INVENTION</sup> ~~purposes,~~

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Claims

1. Pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, said pipe fitting (1) comprising a first tubular portion (6) adapted to be connected to said pipe (2), to which there is connected a second portion (8), adapted to the connection with another pipe fitting (1), characterised in that at least said first tubular portion (6) exhibits an inside coating (9) made of a material having a high mechanical and/or chemical resistance.

2. ~~Pipe fitting (1)~~ <sup>the invention</sup> According to ~~claim 1~~, characterised in that also ~~said~~ <sup>the</sup> second portion ~~(8)~~ <sup>can have</sup> exhibits a coating ~~(10)~~ made of ~~said~~ <sup>the</sup> material having a high mechanical and/or chemical resistance. <sup>The</sup>

3. ~~Pipe fitting (1) according to one or more of the previous~~  
~~claims, characterised in that said first tubular portion (6)~~  
<sup>can have</sup> ~~exhibits~~ elements ~~(11)~~ protruding from its outside surface, adapted to favor <sup>the</sup> the connection of ~~said~~ pipe fitting ~~(1)~~ to <sup>the</sup> ~~said~~ pipe ~~(2)~~. <sup>These can include</sup>

4. ~~Pipe fitting (1) according to one or more of the previous~~  
~~claims, characterised in that it comprises~~ at least one clamping member ~~(12)~~ of said first tubular portion ~~(6)~~ to said pipe ~~(2)~~.

5. ~~Pipe fitting (1) according to one or more of the previous~~  
~~claims, characterised in that said clamping member (12) exhibits~~  
<sup>can have</sup> a tubular body. <sup>The</sup>

6. ~~Pipe fitting (1) according to one or more of the previous~~

~~claims, characterised in that said tubular body is provided with~~  
~~inside protruding elements (13) adapted to favour the connection~~  
~~of said clamping member (12) to said pipe (2).~~

~~7. Pipe fitting (1) according to one or more of the previous~~  
~~claims, characterised in that said clamping member (12) exhibits~~  
~~connection means (14, 15) to at least said first tubular portion~~  
~~(6) of said pipe fitting (1).~~

~~8. Pipe fitting (1) according to one or more of the previous~~  
~~claims, characterised in that said connection means (14, 15)~~  
~~comprises an annular portion (14) extending from said tubular~~  
~~body of said clamping member (12), said annular portion (14)~~  
~~exhibiting a free edge inserted into a groove (15) of said first~~  
~~tubular portion (6) of said pipe fitting (1).~~

~~9. Pipe fitting (1) according to one or more of the previous~~  
~~claims, characterised in that at least said first tubular~~  
~~portion (6) is inserted into a pipe (2) which exhibits an inside~~  
~~layer (5) made of a material resistant to chemical and/or acid~~  
~~and/or abrasive and/or wearing products.~~

~~10. Pipe fitting (1) according to claim 9, characterised in~~  
~~that said inside coating (9) of said first tubular portion (6)~~  
~~is made of the same material as said inside layer (5) of said~~  
~~pipe (2).~~

~~11. Pipe fitting (1) according to claim 9 or 10,~~  
~~characterised in that it comprises a sealing element (16) at~~  
~~least between said first tubular portion (6) of said pipe~~

fitting (1) and ~~said~~<sup>the</sup> inside layer (5) of ~~said~~<sup>the</sup> pipe (2).

~~12. Pipe fitting (1) according to one or more of claims from 9 to 11, characterised in that it comprises an adhesive layer (11) at least between ~~said~~<sup>The</sup> clamping member (12) and ~~said~~<sup>the</sup> pipe (2).~~

~~13. Method for installing a pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, characterised in that it comprises a first step wherein at least one end portion of ~~said~~<sup>the</sup> inside layer (5) of ~~said~~<sup>the</sup> pipes (2) is removed so as to obtain a housing (7) of a tubular portion (6) of ~~said~~<sup>the</sup> pipe fitting (1), also exhibiting a high mechanical and/or chemical resistance, and a second step wherein ~~said~~<sup>the</sup> first tubular portion (6) of ~~said~~<sup>the</sup> pipe fitting (1) is locked into ~~said~~<sup>the</sup> housing (7).~~

~~14. Method according to claim 13, characterised in that it comprises a third step wherein ~~a~~<sup>can</sup> clamping member (12) is connected to at least ~~said~~<sup>the</sup> pipe (2).~~

~~15. Pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, and method for its installation, as described and claimed.~~

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according to the present invention, are achieved <sup>by</sup> realising a pipe fitting for pipes <sup>having</sup> exhibiting a coating <sup>of</sup> having a high mechanical and/or chemical resistance, comprising a first tubular portion adapted to be connected to said pipe, to which there is connected a second portion, adapted to the connection with another pipe fitting, <sup>At least the</sup> characterised in that at least said first tubular portion <sup>has</sup> exhibits an inside coating made of a material having a high mechanical and/or chemical resistance.

The pipe fittings according to the invention are suitably installed through a method for installing a pipe fitting for inside coated pipes, <sup>which</sup> characterised in that ~~it~~ comprises a first step wherein at least one inside layer of said pipes, at at least one of end of said pipe, is removed to obtain a housing, and a second step wherein a tubular portion of said pipe fitting is introduced into said housing.

*Insert "A"*  
Moreover, further features of the present invention are defined in the following claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages of the invention will appear more clearly from the description of a preferred but not exclusive embodiment of the pipe fitting for inside coated pipes and of the method for its installation, according to the <sup>invention</sup> finding, illustrated by way of a non-limiting example in the attached drawings. In <sup>the</sup> such drawings:

Figure 1 shows a portion of a longitudinal section of a pipe fitting according to the <sup>invention</sup> finding, connected to an inside

coated pipe, provided with a flanged connection portion;

/ Figure 2 shows a pipe fitting according to the <sup>invention</sup> ~~(finding)~~ in a step of assembly on a pipe;

/ Figure 3 shows a portion of a longitudinal section of the pipe fitting according to the <sup>invention</sup> ~~(finding)~~ connected to an inside coated pipe, provided with a threaded connection portion;

/ Figure 4 shows a portion of a longitudinal section of a second embodiment of the pipe fitting according to the <sup>invention</sup> ~~(finding)~~, connected to an inside coated pipe; and

/ Figure 5 shows a portion of a longitudinal section of a third embodiment of the pipe fitting according to the <sup>invention</sup> ~~(finding)~~, connected to an inside coated pipe.

#### *SPECIFIC DESCRIPTION*

With reference to the above figures, there is shown a pipe fitting for inside coated pipes, collectively indicated with reference numeral 1.

Pipe fitting 1 is adapted to connect to ~~(one)~~ another pipe 2, of the type comprising an outside layer 3 made of rubber, plastic, thermoplastic rubber, <sup>surrounding</sup> ~~(superimposed to)~~ a layer 4 made of textile (polyester, polyamide, aramide, rayon or other) or metal (wires, strings, strands) plaits or spirals.

In turn, layer 4 <sup>surrounds</sup> ~~(is superimposed to)~~ an inside <sup>or internal</sup> rubber layer 5.

The rubber of layer 5 is <sup>resistant</sup> ~~(adapted to resist)~~ to chemical <sup>attack</sup>, acid, abrasive <sup>and</sup> wearing products, and in general <sup>has</sup> ~~(it exhibits)~~ a high mechanical and/or chemical resistance; the rubber of layer

3 is of the same type as the rubber of layer 5, even though in other embodiments it is of a different type.

Pipe fitting 1 comprises a first tubular portion 6, which is adapted to be <sup>fitted</sup> (connected) into a housing 7 inside pipe 2.

A second portion 8 protrudes from the first tubular portion 6, which is adapted to be connected to another portion 8 of another pipe fitting 1.

In the example shown, portion 8 consists of a flange provided with through holes (not shown) for inserting connection screws. However, in other embodiments, portion 8 is realized <sup>7</sup> in a different manner.

Tubular portion 6 exhibits an inside coating 9 made of a material having a high mechanical and/or chemical resistance.

In a preferred embodiment, the material of coating 9 is the same as that of the inside layer 5 of pipes 2.

Moreover, in the example shown, also the second portion 8 exhibits a coating 10 made of the same material with high mechanical and/or chemical resistance as coating 9.

The first tubular portion 6 <sup>has</sup> (exhibits) a plurality of elements 11 protruding from its outside surface.

Elements 11 engage into layer 5 thus favoring the connection of pipe fitting 1 to pipe 2.

Moreover, pipe fitting 1 also comprises a (clamping) member 12 <sup>clamping</sup> (of) the tubular portion 6 of pipe fitting 1 to pipe 2.

The clamping member 12 exhibits a tubular body provided with



inside protruding elements 13 which, by engaging in the coating layer 3, favor its connection to pipe 2.

Moreover, in a preferred embodiment, the clamping member 12 exhibits connection means to the first tubular portion 6.

Such connection means comprises an annular portion 14 extending from the tubular body of member 12, and <sup>having a</sup> exhibits the free edge inserted into a groove 15 of the tubular portion 6.

In a different embodiment, the clamping member 12 comprises clips or other devices.

Moreover, in housing 7, between the tubular portion 6 of pipe fitting 1 and the inside layer 5 of pipe 2, there is inserted a sealing element 16 which guarantees the continuity of the coating between the same pipe 2 and pipe fitting 1.

The sealing element 16 is realised, for example, through putty, self-vulcanising rubbers, rubbers to be vulcanised or other dopes. *Note that in FIGS. 1 and 3-5, the inner surface of the coating 9, i.e. of the fitting 1 is flush with the inner surface of layer 5.*  
The pipe fitting for inside coated pipes is installed according to the following method.

Pipe 2 is first cut to size according to the needs.

Afterwards, a portion of the inside layer 5 of pipes 2 is removed at the end to which pipe fitting 1 must be connected, so as to obtain housing 7.

Such operation is carried out, for example, through rasping <sup>some</sup> or other known method. *Note that, from FIGS. 1 and 3-5, it is clear that the portion of the layer 5 which remains after the formation of the housing 7 remains aligned with the remainder of that layer.*  
In a second step, the tubular portion 6 of pipe fitting 1 is

inserted into housing 7 and it is locked therein, also thanks to elements 1 that engage into layer 5, or through chemical clamping by means of an adhesive, or ~~other~~ <sup>in some</sup> way.

In a third step, the clamping member 12 is inserted on the coating layer 3 of pipe 2.

In the example shown in the figures, the insertion of the clamping member 12 on pipe 2 is substantially concurrent to the insertion of portion 6 into the same pipe 2.

On the other hand, in the case of clamping members consisting of clips, the clips are applied after having introduced portion 6 of pipe fitting 1 into pipe 2.

The dope that realises element 16 can be applied during the steps of assembly of the pipe fitting on the pipe.

Figures (from) 3 to 5 show further (examples of) embodiment<sup>s</sup> of pipe fitting 1 according to the ~~finding~~ <sup>invention</sup>, wherein equal reference numerals indicated equal or similar elements.

Figure 3 shows <sup>a</sup> pipe fitting 1 where the second portion 8 is threaded.

In the example there is shown a male threading<sup>(g)</sup>, but it is evident that pipe fitting 1 can exhibit a female threading<sup>(g)</sup> <sup>have</sup>.

Figure 4 shows another (example of a) pipe fitting 1 wherein the connection between the clamping member 12 and layer 3 of pipe 2 is <sup>formed by</sup> (realised through) an adhesive layer 17, whereas the connection between portion 6 and layer 5 of pipe 2 is <sup>formed</sup> realised by forcing the same portion 6 into housing <sup>7</sup>, optionally by

interposing an adhesive.

Such embodiment of pipe fitting 1 is adapted, for example, for low-pressure pipes.

Figure 5 shows a further example of a pipe fitting 1 wherein the connection between the clamping member 12 and layer 3 of pipe 2 is ~~realised~~ <sup>made</sup> through an adhesive layer 17, whereas the connection between portion 5 and layer 5 of pipe 2 is ~~realised~~ <sup>made</sup> through elements 11 protruding from the outside surface of the tubular portion 6.

In practice, it has been proved that the pipe fitting for inside coated pipes and the method for its installation according to the invention are particularly advantageous since they allow producing standard size pipes that can be stored and successively cut in any position. The pipe fittings according to the finding can be connected to the ends of such pipes in a simple and quick manner and moreover, the connection can also be carried out at the building yard.

The pipe fitting for inside coated pipes and the method for its installation thus conceived can be subject to several changes and variants, all falling within the scope of the inventive idea; moreover, all details can be replaced with technically equivalent elements.

In practice the materials used, as well as the sizes, can be of any type according to the requirements and to the prior art.

## Claims

1. Pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, said pipe fitting (1) comprising a first tubular portion (6) adapted to be connected to said pipe (2), to which there is connected a second portion (8), adapted to the connection with another pipe fitting (1), characterised in that at least said first tubular portion (6) exhibits an inside coating (9) made of a material having a high mechanical and/or chemical resistance.

2. Pipe fitting (1) according to claim 1, characterised in that also said second portion (8) exhibits a coating (10) made of said material having a high mechanical and/or chemical resistance.

3. Pipe fitting (1) according to one or more of the previous claims, characterised in that said first tubular portion (6) exhibits elements (11) protruding from its outside surface, adapted to favour the connection of said pipe fitting (1) to said pipe (1).

4. Pipe fitting (1) according to one or more of the previous claims, characterised in that it comprises at least one clamping member (12) of said first tubular portion (6) to said pipe (2).

5. Pipe fitting (1) according to one or more of the previous claims, characterised in that said clamping member (12) exhibits a tubular body.

6. Pipe fitting (1) according to one or more of the previous

[claims] characterised in that said tubular body is provided with inside protruding elements (13) adapted to favour the connection of said clamping member (12) to said pipe (2). *ee 1*

7. Pipe fitting (1) according to [one or more of the previous] [claims], characterised in that said clamping member (12) exhibits connection means (14, 15) to at least said first tubular portion (6) of said pipe fitting (1).

8. Pipe fitting (1) according to [one or more of the previous] [claims], characterised in that said connection means (14, 15) comprises an annular portion (14) extending from said tubular body of said clamping member (12), said annular portion (14) exhibiting a free edge inserted into a groove (15) of said first tubular portion (6) of said pipe fitting (1). *ee 1*

9. Pipe fitting (1) according to [one or more of the previous] [claims], characterised in that at least said first tubular portion (6) is inserted into a pipe (2) which exhibits an inside layer (5) made of a material resistant to chemical and/or acid and/or abrasive and/or wearing products. *ee 1*

10. Pipe fitting (1) according to claim 9, characterised in that said inside coating (9) of said first tubular portion (6) is made of the same material as said inside layer (5) of said pipe (2).

11. Pipe fitting (1) according to claim 9 [or 10], characterised in that it comprises a sealing element (16) at least between said first tubular portion (6) of said pipe

fitting (1) and said inside layer (5) of said pipe (2).

12. Pipe fitting (1) according to <sup>cl. 9</sup> [one or more of claims from] [9 to 11], characterised in that it comprises an adhesive layer (17) at least between said clamping member (12) and said pipe (2).

13. Method for installing a pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, characterised in that it comprises a first step wherein at least one end portion of said inside layer (5) of said pipes (2) is removed so as to obtain a housing (7) of a tubular portion (6) of said pipe fitting (1), also exhibiting a high mechanical and/or chemical resistance, and a second step wherein said first tubular portion (6) of said pipe fitting (1) is locked into said housing (7).

14. Method according to claim 13, characterised in that it comprises a third step wherein a clamping member (12) is connected to at least said pipe (2).

15. Pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, and method for its installation, as described and claimed.

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ABSTRACT ~~of the~~ DISCLOSURE

A pipe fitting (1) <sup>has</sup> for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, comprises a first tubular portion (6) adapted to be connected to the pipe (2), <sup>and</sup> (to which there is connected) a second portion (8) adapted to the connection with another pipe fitting (1).

The first tubular portion (6) <sup>has</sup> exhibits an inside coating (9) made of a material having a high mechanical and/or chemical resistance. The pipe fittings (1) are installed <sup>in</sup> according to a method comprising a first step wherein an inside layer (5) of the pipes (2), at one of their ends, is removed to obtain a housing (11), and a second step wherein the first tubular portion (6) of the pipe fitting (1) is introduced into the housing (11).